User's Manual

GE-218S

GPS Receiver Module

Version 1.00

Revision History

Ver.	Date	Description
1.00	Nov. 14th, 2006	Initial Draft

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1 Introduction

1.1 Overview

The GE-218S engine board is a self-contained GPS receiver module. The GPS signal receiving, data acquisitioning and positioning meet the needs such as car navigation, mapping, surveying, agriculture and so on. GE-218S communicates with other electronic utilities via compatible serial communication channels and saves useful satellite data by memory backup to speed up the positioning. With low power consumption of 39mA, the GE-218S tracks satellites using up to 12-channel correlators at a time. It re-acquires satellite signals in 100 ms and updates position data every second. Advanced power saving mechanism allows the unit to operate at a fraction of the time and enter low power mode as it is idle. Intelligently saving satellite data and tracking history permits the user to have a quick position fix even though the receiver usually stays off.

1.2 Features

The GE-218S provides the features that make the host easy for integration.

- ✓ Full implementation of SONY CXD2951 architecture.
- ✓ 12 parallel satellite-tracking channels for fast acquisition and reacquisition
- ✓ Provide superior navigation performance in urban canyon and foliage environments
- ✓ Full navigation accuracy provided by Standard Positioning Service (SPS).
- ✓ Integrated powerful CPU, base band and RF hardware in an SOC (System On Chip) design reduces the space and power consumption in state of the art.
- ✓ Advanced IC technology gets the total receiver cost saving.
- ✓ Allows the receiver to track the satellites using up to 12-channel correlators.
- ✓ High performance firmware drives an excellent positioning speed.
- ✓ Serial communication channel with pre-defined baud rate.
- ✓ No any initialization setup is required while start to use.
- ✓ Support NMEA0183 v3.01 data protocol or SONY proprietary protocol
- ✓ High performance firmware drives an excellent positioning speed.
- ✓ Support super cap to sustain internal clock.
- ✓ Fully shielded.
- ✓ Power saving support.

1.3 Technical Specifications

Features	Specifications
GPS receiver	L1, C/A code, 12 channels
Tracking sensitivity	–152dBm (average) or better
Acquisition sensitivity	–139dBm (average) or better
TTFF (Time to First Fix)	Cold Start: 50s (average) / 60s (95% possibility) Warm Start: 35s (average) / 40s (95% possibility) Hot Start: 2s (minimum) / 6s (95% possibility)
Positioning accuracy	Standard Positioning Service (SPS), WAAS (optional) 2DRMS: approx. 5m
Time accuracy	Precision: 1μs or less
Measurement data output	Update time: 1 second NMEA output protocol: V.3.01 Baud rate: 9600bps (8-N-1) Datum: WGS-84 Type: RMC only
Power consumption	47 mA (average/tracking); 77 mA (average/acquisition) (All without antenna)
Power supply	5V DC
Antenna/RF connector	Active (typical gain 27dB, noise figure 1.5dB)/MCX
Antenna power supply	+3.3V
Operating temperature	-40°C ~ +85°C
Storage temperature	-55°C ~ +100°C

1.4 Serial Communication Interface

1. Serial communication channel and user selectable baud rate among 4800, 9600, 19200, and 38400 (default 4800) bps.

2. NMEA 0183 Version 3.01 ASCII output. (GGA, GLL, GSA, GSV, RMC, VTG, ZDA)

2 Operational Characteristics

2.1 Initialization

As soon as the initial self-test is complete, the GE-218S engine board begins the process of satellite acquisition and tracking automatically. After a position fix has been calculated, information about valid position, velocity and time is transmitted over the output channel.

The GE-218S engine board utilizes initial data, such as last stored position, date, time and satellite orbital data, to achieve maximum acquisition performance. If the initial data is inaccurate, or the orbital data is obsolete, it may take more time to achieve a position fix process. The GE-218S engine board auto-locate feature is capable of automatically determining the position fix without intervention from the host system.

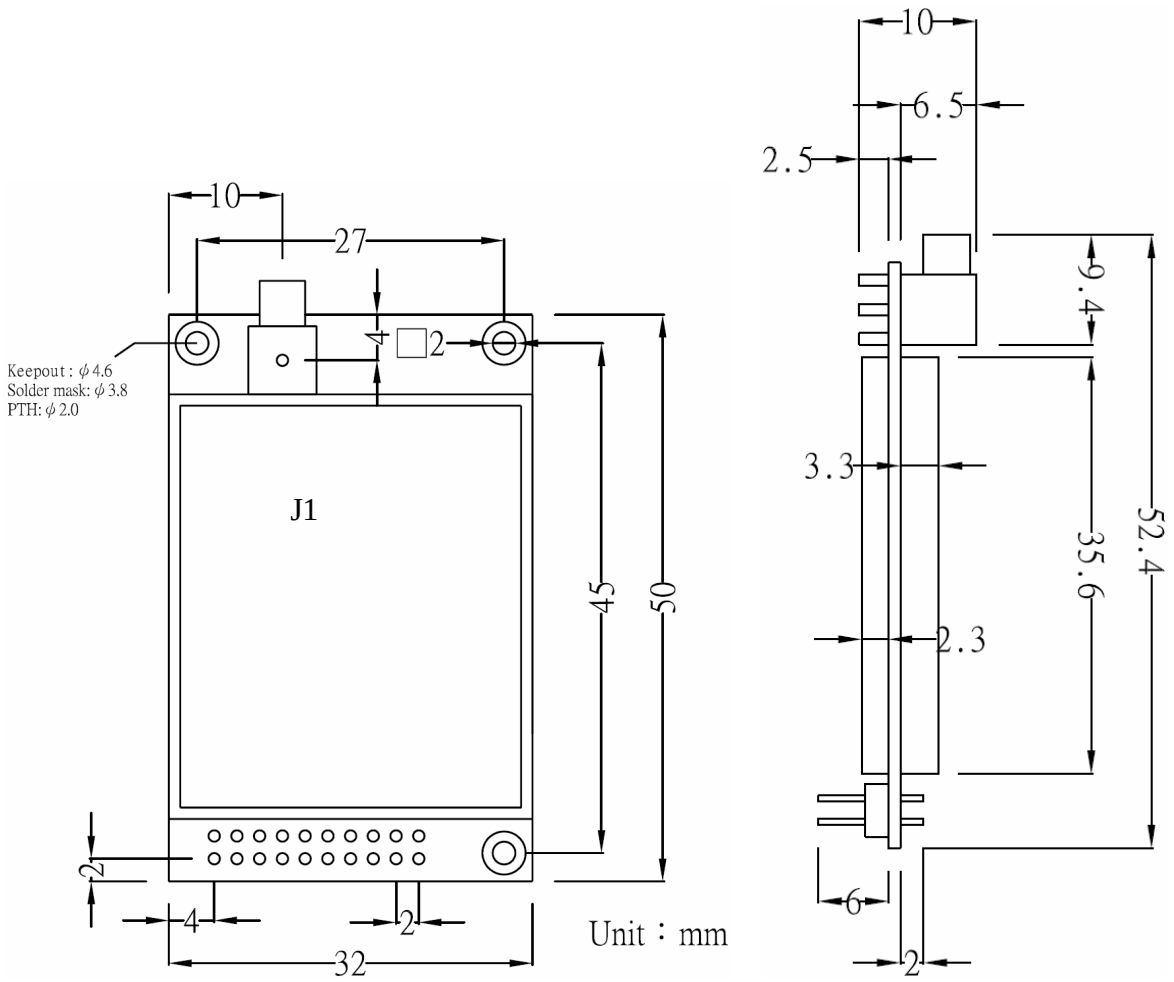
2.2 Navigation

After the position fixing process is complete, the GE-218S engine board sends valid navigation information over output channels. These data include:

1. Latitude/longitude/altitude
2. Velocity
3. Date/time
4. Error estimates
5. Satellite and receiver status

3 Hardware Interface

3.1 PCB Dimension and Layout Descriptions

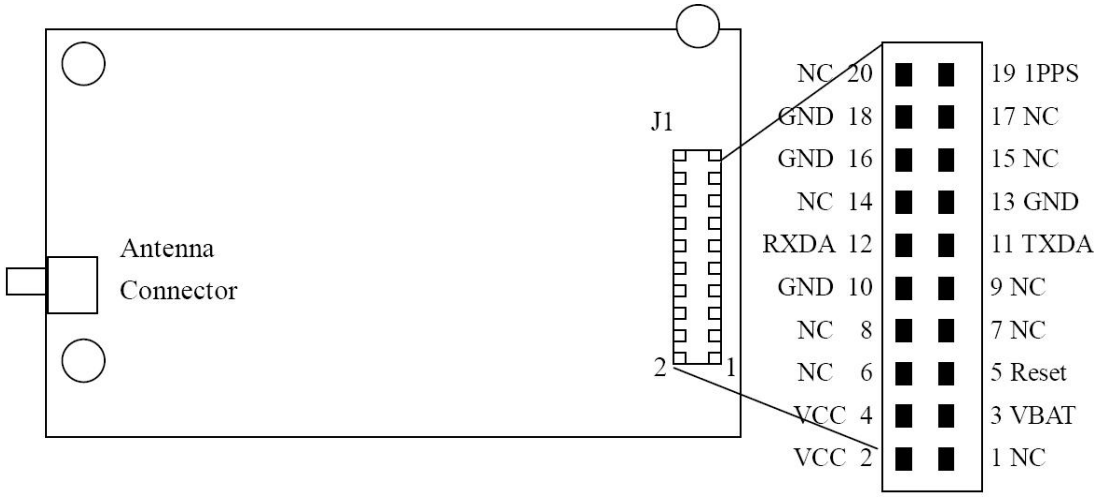


Notes:

1. J1: The serial communication interface I/O connector is connected to GPS application system.

3.2 20-pin I/O Interface

GE-218S engine board supports a 20-pin I/O connector to connect the host controller.



The pin definitions of 20-pin serial communication interface connector:

Pin	Name	Function	I/O	Notes
1	NC	No function	N/A	Do not connect this pin. Leave it open.
2	VCC	5V DC power input	Input	Same as pin 4.
3	VBAT	3.3V DC backup battery input	Input	Optional. To reduce system startup time.
4	VCC	5V DC power input	Input	Same as pin 2.
5	RESET	Active low, to reset the engine board	Input	This pin provides an active-low reset input to the engine board. Activation of this pin will reset and start acquisition process. It may be left open if not utilized. To reset it, the low period of this input signal should be at least 100ms.
6	NC	No function	N/A	Do not connect this pin. Leave it open.
7	NC	No function	N/A	Do not connect this pin. Leave it open.
8	NC	No function	N/A	Do not connect this pin. Leave it open.
9	NC	No function	N/A	Do not connect this pin. Leave it open.
10	GND	Ground	Input	
11	TXDA	Serial data output A (transmit data)	Output	No parity, 8-bit data, 1 stop-bit, NMEA and binary message data output. (TTL) Output High voltage: Min. 2.4V Output Low voltage: Max. 0.4V
12	RXDA	Serial data input A (receive data)	Input	Binary message data input (TTL) Input High voltage: 2.0~3.6V Input Low voltage: -0.3~0.8V
13	GND	Ground	Input	
14	NC	No function	N/A	Do not connect this pin. Leave it open.
15	NC	No function	N/A	Do not connect this pin. Leave it open.
16	GND	Ground	Input	
17	NC	No function	N/A	Do not connect this pin. Leave it open.
18	GND	Ground	Input	
19	1PPS	Time mark output for one pulse per second	Output	This pin provides One-Pulse-Per-Second output from the engine board, which is synchronized to GPS time.
20	NC	No function	N/A	Do not connect this pin. Leave it open.

Notes:

1. Only one UART port is supported.
2. There is no GPIO support.
3. For demand of different baud rate and output sentences, please contact Youngtek. MOQ is required.

4 Software Interface

4.1 NMEA Transmitted Messages

The GPS Receiver Module interface protocol is based on the National Marine Electronics Association's NMEA-0183 interface specification, which is defined in NMEA 0183, Version 3.01. This engine board doesn't support the Radio Technical Commission for Maritime Services (RTCM) for Differential Navstar GPS Services.

The default communication parameters for NMEA output are 4800 baud, 8 data bits, 1 stop bit, and no parity.

The NMEA-0183 Output Messages are shown as below:

NMEA Record	Descriptions
GPGGA	Global positioning system fixed data
GPGLL	Geographic position- latitude/longitude
GPGSA	GNSS DOP and active satellites
GPGSV	GNSS satellites in view
GPRMC	Recommended minimum specific GNSS data
GPVTG	Course over ground and ground speed
GPZDA	Time & Date

It outputs messages in NMEA0183 (Ver. 3.01) format and can output 8 different types of sentence: GPGGA, GPGLL, GPGSA, GPGSV, GPRMC, GPVTG, GPZDA and PSGSA. If 9600bps or 19200bps or 38400bps baud rate is set for port setting, it outputs 7 types of sentence: GPGGA, GPGSA, GPGSV, GPRMC, GPVTG, GPZDA, and PSGSA as default. Moreover, if 4800bps baud rate is set, it outputs 4 types of sentences: GPGGA, GPGSA, GPGSV, and GPRMC as default.

Single message example

$GPGGA,071141,3536.6019,N,13944.8906,E,1,07,01.0,00092.2,M,039.2,M,,*46

$GPGSA,A,3,03,08,11,19,20,27,28,,,,,02.1,01.0,01.9*06

$GPGSV,3,1,09,11,81,327,52,19,43,069,49,20,33,163,45,28,32,314,47*7E

$GPGSV,3,2,09,03,18,093,42,08,29,254,43,27,21,234,44,31,,,00*41

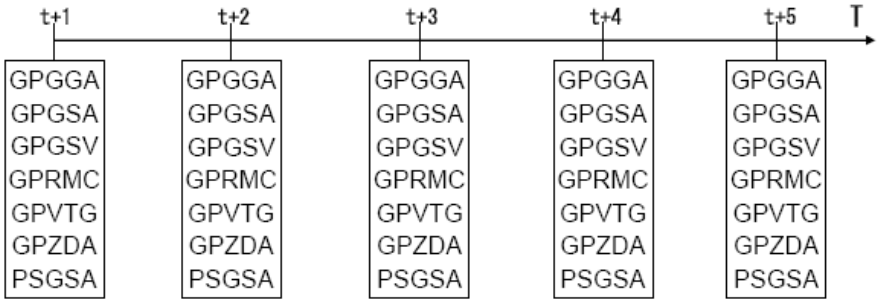
$GPGSV,3,3,09,07,,,00,,,,,,,,,,,,*77

$GPRMC,071141,A,3536.6019,N,13944.8906,E,000.0,000.0,091204,,,A*7D

$GPVTG,000.0,T,,M,000.0,N,000.0,K,A*0D

$GPZDA,071142,09,12,2004,,*45

$PSGSA,4,11,03,28,20,19,27,08,,,,,02.1,01.0,01.9,01028,07114063,5*5C



Single message example(at 4800 bps)

$GPGGA,112350,3536.6006,N,13944.8931,E,1,08,00.9,00098.1,M,039.2,M,,*44

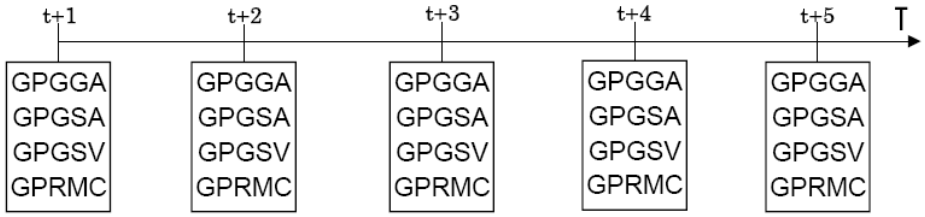
$GPGSA,A,3,09,10,17,18,21,26,28,29,,,,,02.1,00.9,01.8*00

$GPGSV,3,1,11,05,02,178,00,08,03,039,00,09,52,208,46,10,34,120,43*77

$GPGSV,3,2,11,15,09,322,26,17,20,175,41,18,28,313,38,21,43,283,48*78

$GPGSV,3,3,11,26,59,023,50,28,18,063,39,29,50,044,45,,,,*46

$GPRMC,112350,A,3536.6006,N,13944.8931,E,000.0,016.2,240304,,,A*7B



4.1.1 GPGGA sentence

- Explanation

Contents	Example	Unit	Explanation
Sentence ID	$GPGGA		GGA header
UTC of position*1	012041		hh: Hours mm: Minutes ss: Seconds
Latitude	3537.1464		dd: ° mm.mmmm: ′*2
North/South	N		N: North Latitude, S: South Latitude
Longitude	13943.8529		Ddd: ° mm.mmmm: ′*2
East/West	E		E: East Longitude, W: West Longitude*2
GPS Quality Indicator	2		0: Disabled, 1: GPS positioning, 2: D-GPS positioning
Number of satellites	07		Number of satellites used in positioning calculation (00 to 12)
HDOP	01.2		*3
Altitude	00101.2	meters	*4
Unit	M		Meters

Geoidal separation	039.2	meters	*5
Unit	M		Meters
Age of DGPS data	04	second	Time elapsed since D-GPS reception*6
DGPS reference station ID	0000		
checksum	42		
<CR><LF>			End of sentence

- Example

$GPGGA,012041,3537.1464,N,13943.8529,E,2,07,01.2,00101.2,M,039.2,M,04,0000*42

- Note

*1 During non-position fixes, this value is increased from the last position calculation time by one second.

*2 The Longitude is always expressed as 0 degree when the Latitude is 90 degree, and is expressed as Longitude 0(180) degree East when the Longitude is 0(180) degree West.

*3 The DOP value is expressed as two integer digits and one decimal digit. Values 99.9 and higher are expressed as 99.9.

*4 The elevation is expressed as five integer digits and one decimal digit. Values of 99999.9 or more (–99999.9 or less) are expressed as 99999.9 (–99999.9).

*5 The difference from the geoidal surface is expressed as three integer digits and one decimal digit.

*6 The DGPS Age is expressed as two integer digits.

4.1.2 GPGLL sentence

- Explanation

Contents	Example	Unit	Explanation
Sentence ID	$GPGLL		GLL header
Latitude	3537.1483		dd: ° mm.mmmm: ′
North/South	N		N: North Latitude, S: South Latitude
Longitude	13943.8511		ddd: ° mm.mmmm: ′*1
East/West	E		E: East Longitude, W: West Longitude *1
UTC of position*2	034639		hh: Hours mm: Minutes ss: Seconds
Status	A		A: Data valid, V: Data invalid
Mode Indicator	A		A: Autonomous, D: D-GPS, N: Data not valid *3
checksum	41		
<CR><LF>			End of sentence

- Example

$GPGLL,3537.1483,N,13943.8511,E,034639,A,A*41

- Note

*1 The Longitude is always expressed as 0 degree when the Latitude is 90 degree, and is expressed as Longitude 0(180) degree East when the Longitude is 0(180) degree West.

*2 During non-position fixes, this value is increased from the last position calculation time by one second.

*3 Position system mode indicator

4.1.3 GPGSA sentence

- Explanation

Contents	Example	Explanation
Sentence ID	$GPGSA	GSA header
Mode	A	M: Manual, A: Automatic
Positioning mode	3	1: Fix not available, 2: 2D, 3: 3D
Satellite ID number	05	ID number of satellite used in solution
Satellite ID number	06	ID number of satellite used in solution
…		Display of quantity used (12 max)
PDOP	01.6	*
HDOP	01.0	*
VDOP	01.3	*
checksum	05	
<CR><LF>		End of sentence

- Example

$GPGSA,A,3,05,06,09,14,18,23,25,30,,,,,01.6,01.0,01.3*05

- Note

* The DOP value is expressed as two integer digits and one decimal digit. Values 99.9 and higher are expressed as 99.9.

4.1.4 GPGSV sentence

- Explanation

Contents	Example	Unit	Explanation
Sentence ID	$GPGSV		GSV header
Total number of sentences	2		Total number of GSV sentences output (1 to 9) *1
Sentence number	1		Sequence number within total number (1 to 9)
Total number of satellites in view	08		Number of satellites visible from receiver
Satellite ID number	05		Satellite ID (01 to 32) *2
Elevation	61	degrees	Elevation angle of satellite as seen from receiver (00 to 90)
Azimuth	056	degrees	Satellite azimuth as seen from receiver (000 to 359)
SNR (C/N)	35	dBHz	Received signal level C/N (00 to 99) *3
…			
Satellite ID number	14		Write for four satellites

Elevation	52	degrees	
Azimuth	321	degrees	
SNR (C/N)	42	dBHz	
checksum	70		
<CR><LF>			End of sentence

- Example

$GPGSV,2,1,08,05,61,056,35,06,12,158,41,09,23,066,41,14,52,321,42*70

- Note

*1 For 4800 bps, the maximum output lines are 3 lines.

*2 It is outputted in order of Satellite ID number.

*3 “00” when not tracking

4.1.5 GPRMC sentence

- Explanation

Contents	Example	Unit	Explanation
Sentence ID	$GPRMC		RMC header
UTC of position fix*1	093931		hh: Hours mm: Minutes ss: Seconds
Status	A		A: Data valid, V: Data invalid
Latitude	3536.5987		dd: ° mm.mmmm: ′
North/South	N		N: North Latitude, S: South Latitude
Longitude	13944.8905		ddd: ° mm.mmmm: ′*2
East/West	E		E: East Longitude, W: West Longitude *2
Speed over ground	000.0	knots	Receiver’s speed *3
Course over ground	090.7	degrees	Receiver’s direction of travel Moving clockwise starting at due north
Date	241203		dd: Day, mm: Month, yy: Year
Magnetic variation		degrees	*4
East/West			E: East, W: West *4
Mode Indicator	A		A: Autonomous, D: D-GPS, N: Data not valid *5
checksum			76
<CR><LF>			End of sentence

- Example

$GPRMC,093931,A,3536.5987,N,13944.8905,E,000.0,090.7,241203,,,A*76

- Note

*1 During non-position fixes, this value is increased from the last position calculation time by one second.

*2 The Longitude is always expressed as 0 degree when the Latitude is 90 degree, and is expressed as Longitude 0(180) degree East when the Longitude is 0(180) degree West.

*3 The Speed over ground is expressed as three integer digits and one decimal digit. Values

999.9 and higher are expressed as 999.9.

*4 Travel direction (Degree Magnetic) is not output.

*5 Positioning system mode indicator

4.1.6 GPVTG sentence

- Explanation

Contents	Example	Unit	Explanation
Sentence ID	$GPVTG		VTG header
Course over ground	275.6	degrees	Receiver's direction of travel Moving clockwise starting at due north
	T		
Course over ground		degrees	Receiver's direction of travel*1
	M		
Speed over ground	000.0	knots	Receiver's speed (knots) *2
Unit	N		knots
Speed over ground	000.0	km/h	Receiver's speed (km/h) *2
Unit	K		km/h
Mode Indicator	A		A: Autonomous, D: D-GPS, N: Data not valid *3
checksum	0B		
<CR><LF>			End of sentence

- Example

$GPVTG,275.6,T,,M,000.0,N,000.0,K,A*0B

- Note

*1 Travel direction (Magnetic Degrees) is not output.

*2 The Speed over ground is expressed as three integer digits and one decimal digit. Values 999.9 and higher are expressed as 999.9.

*3 Positioning system mode indicator

4.1.7 GPZDA sentence

- Explanation

Contents	Example	Unit	Explanation
Sentence ID	$GPZDA		ZDA header
UTC	105512		UTC time
Day	12		Day according to UTC time
Month	11		Month according to UTC time
Year	2003		Year according to UTC time
Local zone hours		hour	*
Local zone minutes		minute	*
checksum	48		
<CR><LF>			End of sentence

- Example

$GPZDA,105512,12,11,2003,,*48

- Note

* Local zone hours and Local zone minutes are not output.

4.1.8 PSGSA sentence

- Explanation

Contents	Example	Unit	Explanation
Sentence ID	$PSGSA		PSGSA header
Positioning mode	4		See table
Calculation satellite ID	11		Satellite ID number used in speed calculation
Calculation satellite ID	23		Satellite ID number used in speed calculation
…			Display quantity of satellite used (12 max)
PDOP	01.5		Speed calculation PDOP *1
HDOP	00.9		Speed calculation HDOP *1
VDOP	01.2		Speed calculation VDOP *1
TCXO offset value	01682	Hz	*2
Positioning calculation time	10270708		hhmmssxx hh:Hours mm: Minutes ss:seconds xx:0.01seconds Time determined in positioning calculation
SONY Reserve	D		Reserved
checksum	29		
<CR><LF>			End of message

Value	Explanation
0	Speed non-positioning
1	2D speed positioning
2	Pseudo 3D speed positioning
3	3D speed positioning

- Example

$PSGSA,4,11,23,27,03,08,28,20,31,,,,,01.5,00.9,01.2,01682,10270708,D*29

- Note

*1 The DOP value is expressed as two integer digits and one decimal digit. Values 99.9 and higher are expressed as 99.9.

*2 The TCXO offset value is expressed as five integer digits. Values 99999(-99999) and higher(lower) expressed as 99999(-99999).

4.2 NMEA Message Data Output Specifications

The following table describes the output data configurations in the following positioning states:

immediately after cold start, during positioning, during non-positioning and after positioning.

4.2.1 GPGGA sentence

Contents	After cold start	During positioning	During non-positioning
UTC of position	default (00:00:00)	UTC	*1
Latitude	null	Positioning results	Previous value
North/South	N	Positioning results	Previous value
Longitude	null	Positioning results	Previous value
East/West	E	Positioning results	Previous value
GPS Quality Indicator	0	1 or 2	0
Number of satellites	00	Positioning results	00
HDOP	null	Positioning results	null*2
Altitude	null	Positioning results	Previous value
Geoidal separation	null	Positioning results	Previous value
Age of DGPS data	null	null/DGPS information	null/DGPS information
DGPS reference station ID	null	null/DGPS information	null/DGPS information

*1 During non-position fixes, this value is increased from the last position calculation time by one second.

*2 Non-positioning results are based on DOP limit restrictions. So, the DOP value is displayed.

4.2.2 GPGLL sentence

Contents	After cold start	During positioning	During non-positioning
Latitude	null	Positioning results	Previous value
North/South	N	Positioning results	Previous value
Longitude	null	Positioning results	Previous value
East/West	E	Positioning results	Previous value
UTC of position	default (00:00:00)	UTC	UTC
Status	V	A	V
Mode Indicator	N	A or D	N

4.2.3 GPGSA sentence

Contents	After cold start	During positioning	During non-positioning
Mode	A	A	A
Positioning mode	1	2 or 3	1
Satellite ID number	null	Positioning results	null
PDOP	null	Positioning results	null*
HDOP	null	Positioning results	null*
VDOP	null	Positioning results	null*

*Non-positioning results are based on DOP limit restrictions. So, the DOP value is displayed.

4.2.4 GPGSV sentence

Contents	After cold start	During positioning	During non-positioning
Total number of sentences	1	Calculation results	Calculation results
Sentence number	1	Calculation results	Calculation results
Number of satellites in view	00	Calculation results	Calculation results
Satellite ID	null	Calculation results	Calculation results
Elevation	null	Calculation results	Calculation results
Azimuth	null	Calculation results	Calculation results
SNR(C/N)	null	Calculation results	Calculation results

4.2.5 GPRMC sentence

Contents	After cold start	During positioning	During non-positioning
UTC of position	default (00:00:00)	UTC	*
Status	V	A	V
Latitude	null	Positioning results	Previous value
North/South	N	Positioning results	Previous value
Longitude	null	Positioning results	Previous value
East/West	E	Positioning results	Previous value
Speed over ground	null	Positioning results	Previous value
Course over ground	null	Positioning results	Previous value
Date	default (010303)	UTC	UTC
Magnetic	null	null	null
East /West	null	null	null
Mode Indicator	N	A or D	N

* During non-position fixes, this value is increased from the last position calculation time by one second.

4.2.6 GPVTG sentence

Contents	After cold start	During positioning	During non-positioning
Course (True)	null	Positioning results	Previous value
Course (Magnetic)	null	null	null
Speed (knot)	null	Positioning results	Previous value
Speed (km/h)	null	Positioning results	Previous value
Mode Indicator	N	A or D	N

4.2.7 GPZDA sentence

Contents	After cold start	During positioning	During non-positioning
UTC	default (00:00:00)	UTC	UTC
Day	default (01)	UTC	UTC
Month	default (03)	UTC	UTC
Year	default (2003)	UTC	UTC
Local zone hours	null	null	null
Local zone minutes	null	null	null

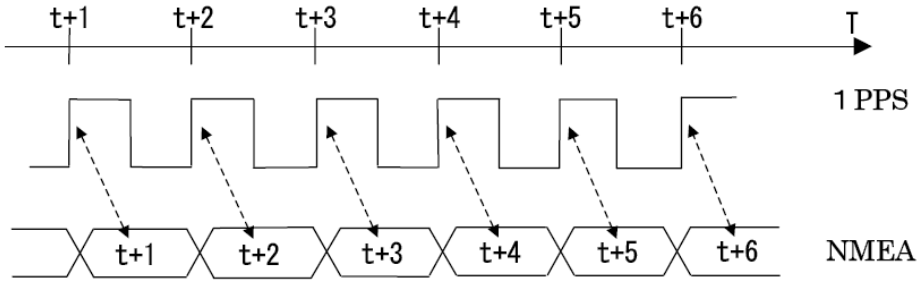
4.2.8 PSGSA message

Contents	After cold start	During positioning	During non-positioning
Positioning mode	0	1 or 2 or 3	0
Calculation satellite ID	null	Positioning results	null
PDOP	Calculation results	Positioning results	null*
HDOP	Calculation results	Positioning results	null*
VDOP	Calculation results	Positioning results	null*
TCXO offset value	00000	Positioning results	Previous value
Positioning calculation time	null	Positioning results	null

* During non-positioning based on DOP limit restrictions, the DOP value is displayed.

4.3 NMEA Message Output Timing

NMEA messages are output within 1 s after the 1PPS pulse as shown in figure below.



4.4 Communication Command

4.4.1 Command Format

The communication command format consists of “@”symbol, a command and command parameters in that order. Command input is recognized after a CR (carriage return) and a LF (line feed) are received.

When an input is successfully recognized, an echo is sent back. Then if the command name and specified parameter values are entered correctly, the command is processed accordingly. However if a command or characters other than those noted in this specification is used, that operation cannot be guaranteed. Command length has a maximum limit of 127 characters (from @ symbol to line feed). If there are over 128 characters including line feed, the operation cannot be guaranteed.

When the command is processed properly, a processing message (shown below) is output as follows according to the command contents.

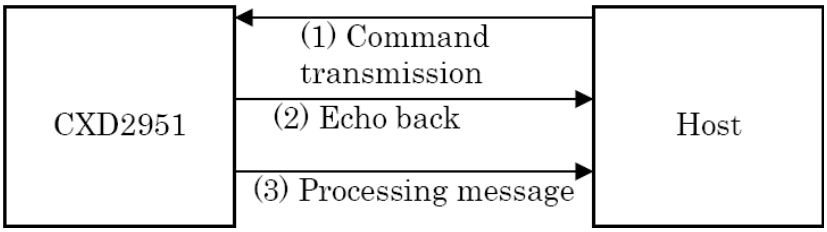
- Response to a basic command

(Example)

(1) @CD ← Command transmission

(2) @CD ← Echo back

(3) [CD] Done ← Processing message



4.4.2 NC command (NMEA sentence output interval setting)

- Usage method

@NC ddddddddd

d: [0|1|2|5]

- Explanation

This command sets the output intervals for individual NMEA sentences (GGA, GLL, GSA, GSV, RMC, VTG, ZDA) and SONY original sentence PSGSA. The command requires 8 integer values (0, 1, 2, 5). The first number indicates the GGA output interval; the second indicates the GLL output interval; the third indicates the GSA output interval; the fourth indicates the GSV output interval; the fifth indicates the RMC output interval; the sixth indicates the VTG output interval; the seventh indicates the ZDA output interval; and the eighth indicates the PSGSA output interval. There are four different interval settings: 0, 1, 2, and 5. If 0 is set, the message is not output.

If any output interval arguments are not set, the current setting is used. The default setting is 10111000 for baud rate 4800bps. (GGA, GSA, GSV and RMC are output every second; GLL, VTG, ZDA and PSGSA are not.)

For baud rate 9600bps and above, the default setting is 10111111. It means GGA, GSA, GSV, RMC, VTG, ZDA and PSGSA are output every second; GLL is not.)

- Example 1

To output GGA every time and output GSA once every two times:

@NC 10200000

- Example 2

To output RMC only every time:

@NC 00001000

4.4.3 CLR command (clear set parameters)

- Usage method

  @CLR

- Explanation

This command resets the user-set parameters to the default values; clears the time, position, Almanac data, Ephemeris data, and TCXO offset value; and restarts the equipment.

4.4.4 CD command (cold start)

- Usage method

  @CD

- Explanation

This command performs a cold start reset. Cold start resetting clears the time, position, Almanac data, Ephemeris data, and TCXO offset value; and resets the software. While some user-set parameters are held, others return to the default values.

4.4.5 SW command (warm start)

- Usage method

  @SW

- Explanation

This command performs a warm start reset. Warm start resetting clears the Ephemeris data and resets the software. While some user-set parameters are held, others return to the default values.

- Note

If the GE-218S does not have Almanac data from four or more visible satellites, a cold start is performed instead

4.4.6 SR command (hot start)

- Usage method
  @SR

- Explanation

This command performs a hot start reset. Hot start resets the software while retaining the time, initial position, Almanac data, Ephemeris data, and TCXO offset value.) While some user-set parameters are held, others return to the default values.

- Note

If the GE-218S does not have Ephemeris data from four or more visible satellites, then a warm start is performed instead. If the GE-218S does not have Almanac data from four or more visible satellites, then a cold start is performed.

4.4.7 OI command (message output interval setting)

- Usage method
  @OI interval
  interval: [0 | 1 | 2 | 5 | 10]

- Explanation

This command changes the output interval of positioning result messages. The settings are 0, 1, 2, 5, and 10 seconds. If 0 is set, message reporting isn't outputted. To resume output, set a value other than 0. If the interval value argument is not set, the current setting is reported. The setting is held internally even if the @CD, @SW, @SS or @SR reset commands are transmitted.
The default value is 1.

- Example

Setting the output interval to every 5 seconds
@OI 5

4.4.8 CB command (change baud rate)

- Usage method
  @CB [4800 | 9600 | 19200 | 38400]

➢ Explanation

This command changes the communication baud rate.

➢ Note

1. The baud rate is defined by hardware setting. The baud rate change using the CB command is valid only during the execution time. It returns to default baud rate as it is restarted.
2. After the baud rate is changed, the communication is stopped and thus the message output stops. To continue message output, setting communication baud rate to new setting is required.
3. The NMEA messages output of different baud rates are different. Please see section 4.1.

➢ Example

Change the communication baud rate to 38400.

@CB 38400

4.4.9 PLM command (low power mode setting)

➢ Usage method

@PLM [0 | 5..10] [MD | ME] [PD | PE]

T: [0 | 5..10] interval time of positioning

MD: stop message in interval time

ME: output message in interval time

PD: not control EPORT12 synchronized with sleeping

PE: control EPORT12 synchronized with sleeping

➢ Explanation

This command sets the low power mode. If the low power mode is requested, the position update will be intermittent as specified.

Interval time settings are 0, 5, 6, 7, 8, 9, 10 [sec]. If 0 is set, the low power mode is terminated and the GE-218S operates at the normal mode. If ME is set, NMEA messages are generated periodically at 1Hz. Set MD if NMEA messages are not needed between the positioning updates.

If the all arguments are not set, the current setting is reported. If MD or ME, PD or PE is not set, the previous setting is held. Default setting will be selected after the @CD, @SW, @SS or @SR commands. The default values are

Interval time: 0(normal mode)
Message output: ME
Port control: PD

- Note

Suggest not use ME, PE commands.

- Example

NEMA messages output in every 10 seconds and without port control.
@PLM 10 MD PD

4.4.10 WA command (WAAS/EGNOS function setting)

- Usage method

@WA [ON | OFF] [PRN]
ON: WAAS/EGNOS function ON
OFF: WAAS/EGNOS function OFF
PRN: [0 | 120..138] WAAS/EGNOS PRN number

- Explanation

This command sets the WAAS/EGNOS function.
When set to ON, the GE-218S receives WAAS/EGNOS satellite signals from specified PRN number (satellite). Correction information is downloaded after the initial position measurement. The GE-218 outputs the corrected position once the information is decoded.

PRN number is the WAAS/EGNOS satellite number. If 0 is set, the highest elevation angle WAAS/EGNOS satellite is automatically selected.

When no argument is set, the current settings are output. When PRN is not set, the previous settings are kept. The setting is held internally even if the @CD, @SW, @SS or @SR commands are transmitted. The default values are

WAAS/EGNOS function : OFF
PRN : 0 (automatic WAAS/EGNOS satellite selection)

- Note

If WAAS/EGNOS function is set to ON from OFF or it is set to OFF from ON, a software reset

is performed. Since WAAS/EGNOS function can also be set to ON by the port setting, user have to set Port:EPORT8 to “Low” in order to use @WA command.

- Example

WAAS/EGNOS function is set to ON with automatic WAAS/EGNOS satellite selection.

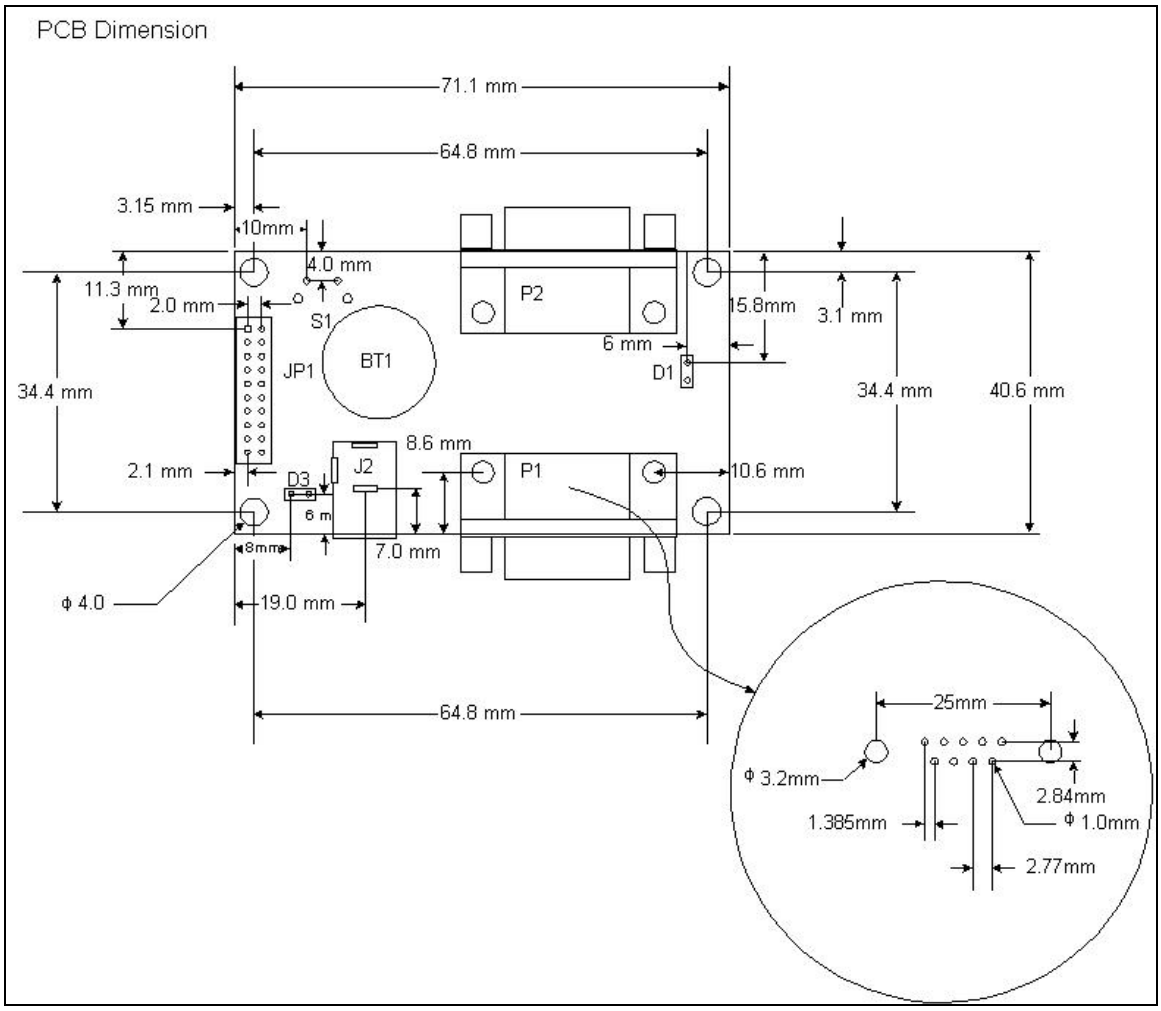
@WA ON 0

5 Engine Board Evaluation Kit

5.1 Overview

The Evaluation Kit is defined specially for testing the GE-218S. It connects to the GE-218S through JP1, 20-pin connector and converts the serial communication signals to the RS-232 signal level. It also connects the RS-232 signals to PC's COM port through P1. One can run the test program on PC to get the NMEA 0183 data and issue commands from PC for binary mode operations.

The Evaluation Kit outline is shown as below:



Notes:

1. J2: The DC power connector, is connected to DC +5V power supply.

2. JP1: Serial communication interface connector is defined in section 3.2.
3. P1: RS-232 port-1, is used to output the NMEA-0183 data and also used to input and output binary messages.
4. P2: RS-232 port-2. There is no such port for GE-218S.

5.2 Serial Communication interface

Refer to section 3.2 for the pin definitions of 20-pin serial communication interface connector.

5.3 Installation

First, it needs to connect the GE-218S engine board to the evaluation kit. The evaluation kit provides the physical link conversion for the serial communication. It can connect the P1 RS-232 port of the evaluation kit to COM port of the PC for testing.

Second, it needs to setup the testing software on PC. We support a testing utility, Stella, on PC for customer test. It can also run other GPS testing tool from third party supplier.

5.4 LED indications

There are two LEDs on the evaluation kit. One is for power on indicator and another is the GPS status indicator.